(12) UK Patent Application (19) GB (11) 2 290 431 (13) A

(43) Date of A Publication 20.12.1995

(54) Interactive television system

(57) A method of providing an interactive program to a television user comprised of transmitting a television program, transmitting variables relating to possible television program choices within the vertical blanking interval of the television program, storing the variables at a user location, displaying the television program, and modifying the variables at the user location during the progress of the television program so as to change the progress of the television program. Program choice variations are controlled at the user location rather than at the head end.

FIG. 2

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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.
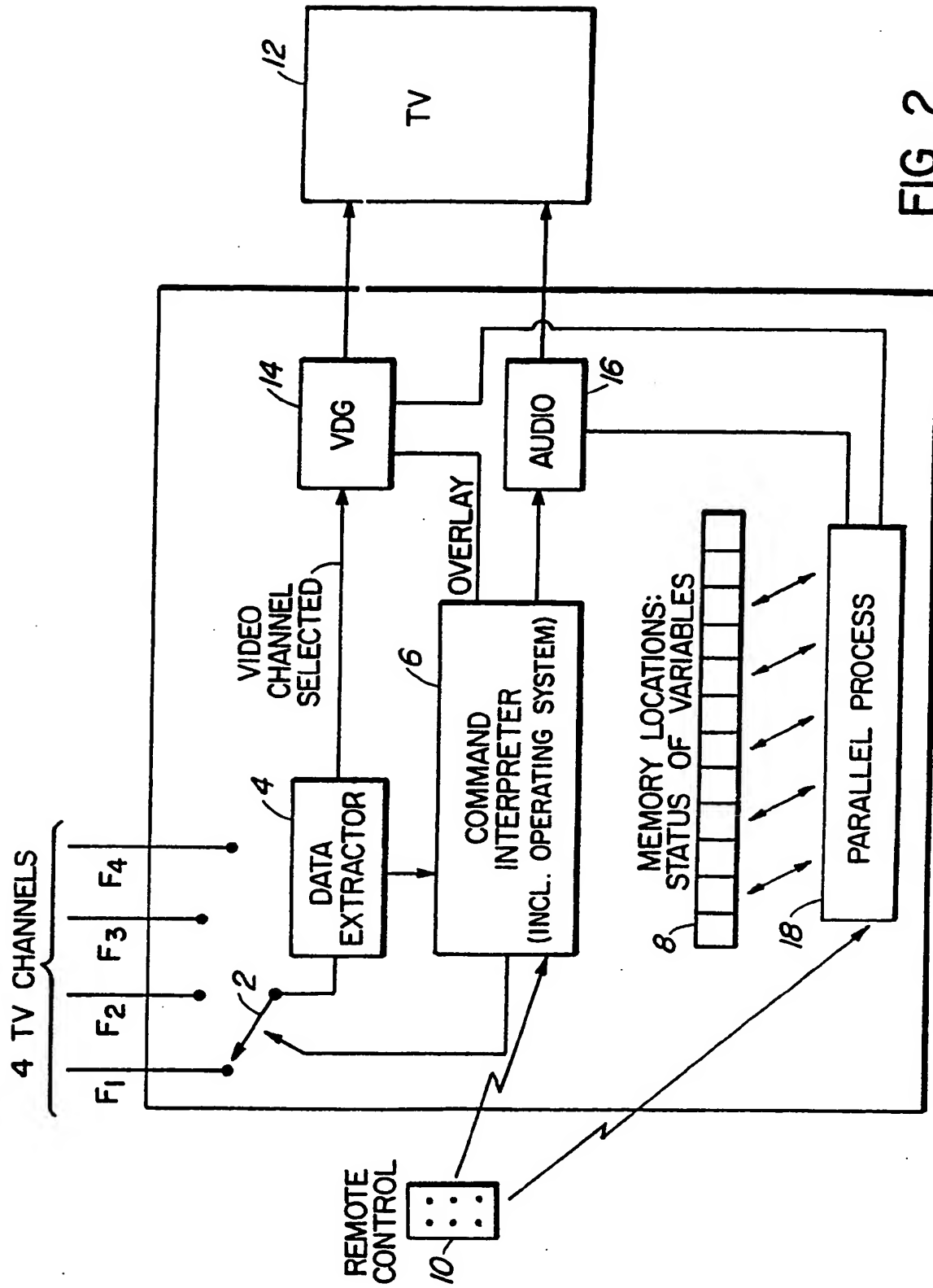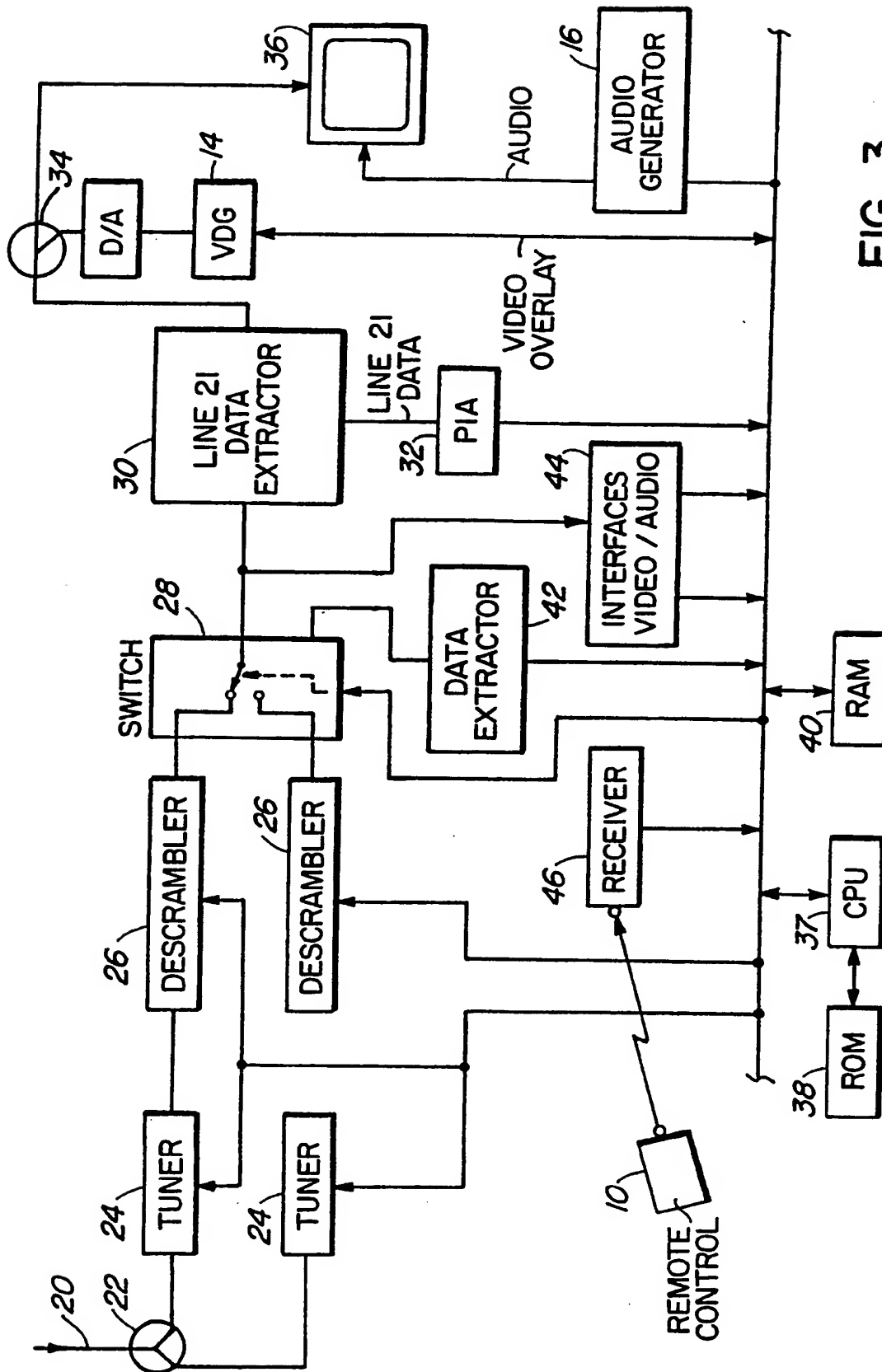
PRIOR ART

FIG. 1

FIG. 2

FIG. 3

INTERACTIVE TELEVISION SYSTEM AND METHOD

FIELD OF THE INVENTION

This invention relates to the field of television and in particular to a method of providing interactive television programs to one or a plurality of
5 users.

BACKGROUND TO THE INVENTION

Interactive television can be provided without an uplink to a head end by providing several alternative channels relating to the same program to users, and by
10 allowing them to select which of the channels they view by means of a local control.

For example in a sports event, several cameras can be located so as to provide different angles and distances from the play, and feed different channels.
15 The user can select whichever view he wants by switching channels, but a decoder system at the user location makes it appear as if the various views are received on the same channel, in a single program.

In another example, a drama may be broadcast
20 with various alternative program segments on different channels. The user, by using a local control, can select alternative plots, the local control switching channels in a manner transparent to the user.

In another system, different audio channels are
25 transmitted with a single video channel. The user, in selecting different plot lines, selects different audio channels. In this form of interactive television, there is a lip sync problem, which restricts its application to display of inanimate objects, such as playing cards
30 and games, puppets, etc.

A group of U.S. patents that have advanced the state of the art, and are assigned to ACTV, Inc., are 4,264,924, 4,264,925, 4,573,072, 4,602,279, 4,847,698, 4,847,699, 4,847,700 and 4,918,516. In summary, the
35 ACTV patents describe a seamless system in which at

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least a pair of television channels involving different related parts of a program are transmitted on two television channels. Control data is transmitted via a narrowband data channel, in the vertical interval of the video channel, i.e. in scan line 21. At a user location (station), a pair of tuners tune the different channels when a user requests a change in the program which would require a channel change, The control data information to the tuners instruct a switch when to change channels by controlling a selection switch receiving the output of a particular channel at the vertical interval of a frame, and at a time related to the content of the television program, and can be, for example, several seconds after the user selects a program segment change. This provides seamless switching of the program information.

For example, if a television program is a card game, an announcer may request the audience to select a card or the result of a showing of cards on the television screen. Different channels will show different program segments following the selection by the user, by means of a user remote control. Different viewers would use their remote controls to make the selection at different times, some even while the announcer has not completed the instruction. The control data carried in the data channel would control whether the channel should be switched, depending on the selection of the viewer, and in addition would restrict switching of the channel until the announcer has completed the instruction and until the next segment of the television program begins. Otherwise the program would be switched too early, and the proper program segment appropriate to the viewer selection would not be available until some time later (e.g. a fraction of a second to several seconds later), which would result in

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annoyingly interrupted and poor programming.

       The ACTV system and an improvement to it is illustrated in block diagram in Figure 1. Four TV channels, in this example, carrying different segments

5   of the same television program at appropriate times are fed via four input lines F1, F2, F3 and F4 to an electronic switch 2. The program on a selected channel is fed to a line 21 data extractor 4, from which the control data referred to above is extracted. This data

10   is provided to a command interpreter 6. The command interpreter decodes the control data and stores status data for variables in a memory 8. The command interpreter also receives control signals from a user remote control 10. The selected video channel is

15   provided to a television set 12.

       In operation in accordance with one form of this design, the user responds to the program being watched, and pushes a selection button on the remote control 10, and a resulting signal is received by

20   command interpreter 6. The command interpreter accesses the data stored in memory 8, and as a result from the variable status data that is stored, can determine which response has been selected, which channel should be switched to as a result of the particular response that

25   has been selected, and when should the channel be switched. It also monitors the timing of the vertical intervals and controls the switch 2, to select a new channel, if that is required based on the user selection. A seamless television program is thus fed to

30   the television set 12, transparently to the user, based on the response selected, which can be different for different users.

       In another form of this design, the command interpreter controls a video display generator (VDG) 14.

35   In this case, depending on the selection, a limited

number of graphics generated by the VDG can be inserted
over the video program, such as which may prompt the
user to react and make choices by pressing some of the
active remote control buttons, to display the results of
5   selections, etc.   The graphic overlays have been limited
to small icons, or small areas that display numbers or
comments.

The command interpreter can also control an
audio generator or synthesizer 16, which feeds an audio
10   input to the television set (merged with or switched in
place of the program audio), which can generate a
warning beep when the user pushes the wrong button, or
make some other sound.

The systems described above, while providing an
15   effective interactive television experience for the
user, is limited to the control data and to the program
segments transmitted by the head end.   As the reader
will appreciate, it is not truly interactive, but only
apparently interactive, since all possible program
20   segments and channel switching control signals must be
predetermined from the head end, and all graphics
generated by the VDG and sounds are predetermined.   As
such it is limited in capability.

A single channel system based on an early ACTV
25   concept was at one time sold as a View-Master
Interactive Vision (VMIV) system.   This system provided
an interactive video program on a video tape, with
accompanying control programs which related to specific
interactive segments of the video program recorded just
30   ahead of those specific segments.   Recorded in the video
program are colored stripes which are displayed at the
sides of the video screen at or just before the
beginning of each of the control programs.

In operation, the user would progress the tape
35   forward or backward to find the colored stripes.   A VCR

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carrying the tape would then be started, beginning the
program from that location on the tape. A controller
would detect the control program and as the interactive
video program progressed and the user pressed certain
5   control buttons on or associated with the controller,
overlay graphics would be generated and displayed and
sounds would be generated, modifying the displayed
program in accordance with the pressed control buttons
in an apparent interactive manner.

10   Several problems existed with the VMIV system.
Firstly the user had to start the videotape at a
particular place. If this were not done, interactively
for a segment was not obtained.

Secondly, the system could not be used with
15   off-air or cable supplied programs. The interactive
program is present to what is recorded on a single video
tape, which could use a coincident head and supplied
program as a feed, since the control program would not
be in any way related to it.

20   Thirdly the system was restricted to a single
channel. Thus for example directed channels could not
be achieved.

Fourthly, if a person wished to participate in
the program from somewhere in the middle, he was
25   required to either rewind the tape until he saw the
colored stripes, then started the program to play in a
forward direction, or he had to delay interacting with
the program until the next pair of stripes appeared. In
both cases excitement and enjoyment of using the program
30   was lost.

The requirement to rewind or otherwise find the
colored stripes on the display was tedious and was not a
pleasant experience, and reduced incentive to play the
program, thus reducing or eliminating its commercial
35   success. In addition, the presence of the colored

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stripes was found to be an intrusion on the display, reducing the quality of the video program displayed, and making it look unedited.

SUMMARY OF THE INVENTION

5   The present invention is an improvement to the above-described VMIV system, and is a method and system for providing a true interactive television program to a user. As such, the present invention significantly decreases the limitations of the above-described above-
10   described systems, and is significantly different in concept, structure and result therefrom.

        In accordance with the present invention, a local memory stores a software program which can interact with the memory storing the variable status
15   data, and change the variable status data. For the purposes of this specification, this function will be called a parallel process.

        The parallel process can change the variable status data by itself, depending on content of data in
20   the data channel retrieved by the command interpreter, depending on time, depending merely on the software program itself based on any criteria, or based on a user input from a user control. As such, the parallel process can read and modify the data representing the
25   status of variables during the television program in the memory locations.

        Thus in the present invention, the user can interact with the television program as described with reference to the ACTV design, but now in addition, the
30   television program can interact with the software program and vice versa, and the viewer can interact with the software program and vice versa, thus providing a rich array of possibilities to change what the viewer sees, hears and interacts with.

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The apparatus that is controlled can be located either at the actual user location or at a virtual user location adjacent the head end, in the latter case using an uplink in a two-way CATV system, for example.

5   In accordance with an embodiment of the present invention, a method of providing an interactive program to a television user is comprised of transmitting a television program, and transmitting variables relating to possible television program choices, storing the

10   variables at a user location, displaying the television program, and modifying the variables from the user location during the progress of the television program, to change the progress of the television program, whereby program choice variations under control of a

15   user location based on variables modified at the user location rather than modified from a head end are obtained.

In accordance with another embodiment of the invention, a method of providing an interactive

20   television program to a television user is comprised of the steps of downloading a software program to a user station, receiving a television program, and interacting with the software program to change or create at least one of audio, graphics and animation on a television

25   monitor and or change a program segment of the television program, for display on the television monitor.

In accordance with another embodiment of the invention, a method of providing an interactive

30   television program to a television user is comprised of the steps of downloading a software program to a user station, transmitting a television program having plural parallel segments, and at least one of: the user inter- acting with the television program to view different

35   segments, the user interacting with the software program

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to enable the software program to cause display of graphics or animation for viewing by the user, and the software program selecting different segments of the television program for viewing by the user.

5   In accordance with another embodiment of the invention, apparatus for controlling interaction of a user with a television program is comprised of apparatus for receiving a television program having several parallel segments, apparatus for storing parameters

10   relating to the segments, apparatus for controlling display to the user of segments based on a look-up of the parameters, and apparatus for varying the parameters under local control.

BRIEF INTRODUCTION TO THE DRAWINGS

15   A better understanding of the invention will be obtained by reading the description of the invention below, with reference to the following drawings, in which:

Figure 1 is a block diagram of a prior art

20   system,

Figure 2 is a block diagram of a system in accordance with a preferred embodiment of the present invention, and

Figure 3 is a more detailed block diagram of

25   the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

Turning to Figure 2, a system is shown which is a modification of the system shown in Figure 1, wherein similar elements are given similar reference numerals.

30   However, in the present invention a parallel process is provided, which parallel process is comprised of the operation process involving the software program and the system processor, to be described in more detail with respect to the Figure 3.

35   The parallel process reads and can modify the

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data in memory 8, and in addition can cause the generation of various displays by the VDG, and various sounds and/or synthesized speech and music by the audio generator.

5   Different ways in which the system can operate will now be described.

Different ways in which the system can operate, the television program is received as in the prior art system, and the line 21 data is decoded by the command

10   interpreter and is stored in memory 8. This of course can occur in a dynamic manner, with the data being changed as the program content requires.

The data stored in memory 8 is consulted by the software program and the software program changes its

15   behavior depending on the content of the variables. Thus the variables become an essential part of the operation of the software program.

For example, depending on the content of the variables, the software program may provide a half

20   screen graphic in a wipe procedure, in the event particular variables relate to a program segment that requires anticipation of what is obscured by the graphic, and later a venetian blind reappearance of the program behind the graphic (i.e. disappearance of the

25   graphic).

As another example, the software program may provide a cartoon character graphic with synthesized voice to provide an instruction, or to fill a time gap or segway in the programming, based on the data stored

30   in memory 8.

None of the above were capable of being provided in the prior art system.

A second way in which the present invention can operate is to have a user provide commands via the

35   remote control 10 to the parallel process. In this

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case, the software program itself can display choices or can ask questions on the television screen by controlling operation of VDG 14, and can cause voice synthesization of the questions or provide other audio

5   sounds, by controlling audio generator 16.

In the prior art system, the television program itself provides choices to the user. When the user makes the choice, the result is stored in memory 8 and the result is the command interpreter changing channels.

10   Thus, the number of choices is limited to the number of channels carrying the various segments of the television program, four, for the four channel system shown. While the present invention still accommodates that prior art capability, the parallel process can provide a rich

15   array of other capabilities depending on the software program of the parallel process. This allows use of a large number of applications buttons (switches) on the remote control to enable the array of capabilities.

For example, assume that a marionette character

20   in a television program informs the viewer that he will sing a song and promises a reward to the user for pressing a certain button (not one that results in a channel change) every time a favorite number, previously selected by the user, is included in the words of the

25   song. Every time the viewer meets these conditions, a graphic locally generated under control of the parallel process, is overlaid on the screen showing lively animated graphics.

In this case, the user has interacted with the

30   television program by selecting a number by inputting it on the remote control. This selection is detected by the parallel process, which stores it in a local memory, or in memory 8. In this case the user has used a button on the remote control different from one that causes a

35   channel change, in the prior art system. At an

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appropriate time in the television program, when the
marionette sings the number, the user pushes the same or
another button, which is detected by the parallel
process. The parallel process checks the memory 8,

5   detecting whether or not the latest selected button
conforms to the originally selected number, and checks
data stored in memory 8 to determine whether it is
enabled to react to it (premature pushing of a button,
being equivalent to premature selection, being

10   inhibited). Thus the line 21 data stored in memory 8
can provide a selection window during which the number
selection is valid, and thus during which the software
program can use the user input to perform its next
routine.

15   The selection having been made, the software
program in the parallel process can cause generation of
the graphic overlay to be displayed in accordance with
the correctness or incorrectness of the input by the
user.

20   Thus in this case the user has interacted with
the software program, and has not been limited to use
only of four buttons on his remote control substantially
conforming to the four channels input to the system from
the head end, as was required in the prior art.

25   In another manner of operation of the present
invention, the software program of the parallel process
can modify the program variables stored in memory 8,
which may or may not be based on the television program
content.

30   For example, the user may initiate operation of
a software program routine by use of the remote control.
The parallel process detects the data stored in memory
8, which can involve program content. In one such case
the television program may be a story which can result

35   in either male and female leads having an ending by

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being together, or by parting, story lines of the
television program being different in certain segments
to achieve either end. The user can be prompted at the
beginning to choose which form of ending is preferred,
5   which is input via one of the buttons on the remote
control 10. The resulting data is stored in memory 8 or
in a separate memory associated with the parallel
process.

Now the parallel process tracks the data stored
10 in memory 8 relating to the story line, and at
appropriate times dictated by the original input from
the user, automatically sends commands to the command
interpreter to control switch 2 during the progress of
the television program to select program segments
15 appropriate to the ending preselected by the user.

As another example, a television network
provides electronic mail boxes for individual subscriber
station. An advertiser, at the start of a television
program, sends over the network, at random station
20 addresses, a premium gift to 500 of the mail boxes, and
asks the viewers to verify for the message in their mail
boxes. The data to the 500 addresses notifying that
they are winners is stored in memory 8 or another local
memory that stores electronic mail. Those viewers which
25 respond, push a designated button on their remote
controls, acknowledging receipt of the premium. The
parallel process checks the locally stored winner-
designating data, making a verification, and if correct,
stores data in memory 8 to this effect. That data is
30 used by the command interpreter to automatically select
the channels to be presented to the winners for program
segments related to winners, while if the viewer is not
a winner, different data is stored in memory 8, that is
used by the command interpreter to select channels
35 having the segments related to persons other than

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winners. Thus the television program becomes different for the winners (which may be shown details of the prize they have won, for example) from others.

Figure 3 illustrates a system that may be used
5   to implement the present invention. An antenna or cable provides television signals via input 20 to a splitter 22, which splits the signals and provides them to the inputs of tuners 24. While two tuners are shown, it should be recognized that one may be used.

10   The output signals of tuners 24 are applied to the inputs of respective descramblers 26. The outputs of the descramblers are applied to inputs of electronic switch 28. Switch 28 corresponds to switch 2 of the embodiment described with respect to Figure 2. The
15   output of switch 28 is applied to the input of line 21 data extractor 30, which provides the data signal from line 21 of the video signal applied thereto to PIA 32, and passes the video signal via combiner 34 to television set or monitor 36.

20   A central processor 37, to which is connected a read only memory (ROM) 38, is connected to a bus 38. Random access memory (RAM) 40 is also connected to bus 38.

A data extractor 37, whose function will be
25   described below, is connected to the switch 28, and an output connected to bus 38. Video and audio interfaces are also connected to switch 28, for receiving video and audio signals carried by the output line of switch 28.

A remote control 10 has a preferably infrared
30   transmitter, and a receiver 46, which has an output interfacing bus 38, has an infrared receiver for receiving infrared signals from the infrared transmitter of remote control 10.

RAM 40 contains an operating system, data input
35   from remote control 10 to receiver 46, and part of which

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forms memory 8, containing program variables. ROM 38 contains a user station address as well as a booting program, which operates in conjunction with CPU 37 in a well known manner.

5   In operation, assume television programs are being received via one of the tuners 24. With no scrambled signal, the descrambler passes the signal, not needing to descramble it. The signal is passed to switch 28, where it is passed via line 21 data extractor

10   to television monitor 36.

Wideband data is carried on a data channel, which is received via the same, or in this embodiment, the other tuner. For example, the wideband data can be an operating system for CPU 37. This data is extracted

15   from the line carrying it by data extractor 42, and is passed to CPU 37 via bus 38. CPU 37 stores the operating system program in RAM 40 under control of the booting program stored in ROM 38.

Once the operating system has been received, a

20   software program for operating the parallel process is similarly downloaded from the head end and is stored in RAM 40.

Assuming that an interactive program is to be received, both (or more) tuners 24 tune the channels

25   which carry the various continuous segments of an interactive television program. Alternatively, if the interaction is to be done using the parallel process described earlier, as few as a single channel may be used, with a single tuner, whereby the interaction is

30   exclusively between the parallel process and the user, and/or between the parallel process and the VDG 14 and audio generator 16.

When an interactive program is received, data is present in the line 21 data channel, which is

35   detected by data extractor 30 and is passed via PIA 32

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to processor 36.   Processor 36 stores variable status
bits in RAM 40, in memory locations corresponding to
memory 8 (as described with reference to Figure 2).

Assuming that the television program causes
5   display of a selection to the viewer on monitor 36, the
user pushes a button (closes a switch) on the remote
control 10.   This causes a signal to be transmitted via
its infrared transmitter to an infrared receiver of
receiver 46.   The data is provided to CPU 37, which
10   stores it in RAM 40.   CPU 37 then checks the meaning of
the selection, and the status bits relating to the
program from memory 8, and in one example, is enabled
when a status bit indicating the end of a television
program segment is changed, as a result of receipt of a
15   variable in line 21 of the television signal.   The CPU
then issues a command to switch 28 to switch its output
signal from a different tuner.   This is received in a
seamless manner at monitor 36 where it is displayed.

As described above, data received from the
20   remote control is received by receiver 46 and stored in
RAM 40 for interaction by the parallel process, which
can control the generation of graphics by VDG 14 and/or
the generation of synthesized sound by audio generator
16 for application to the sound input of monitor 36.
25   Further, as described above, the CPU 37, under
control of the software program of parallel process
stored in RAM 40, the software program can change the
data stored in the memory 8 portion of RAM 40, for
controlling operation of switch 28.
30   Thus an embodiment of the invention is
comprised of downloading a software program to a user
station, receiving a television program, and interacting
with the software program to change or create at least
one of audio, graphics and animation on a television
35   monitor and/or change a program segment of the

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television program, for display on the television
monitor. Choices can be presented to the user, for
example by means of a displayed menu, and the user
selects an item from the menu. A peripheral controller
5 can be controlled to control a peripheral device by
means of the software program reacting to the selection
of the item.

The television program can be transmitted via
single channel, the program segment being changed by
10 means of the software program, or at least some segments
of the television program can be transmitted
simultaneously via different channels, and program
segments changed under control of the software program
switching channels to program the television program in
15 a seamless manner.

The software program can be downloaded at
intervals during the television program, rather than
only at the beginning, which allows persons tuning to
the program after it has started to participate with the
20 program in an interactive manner.

The content of the software program is
preferred to be synchronized with the content of the
television program, separate downloads of at least parts
of the software program being done during the progress
25 of the television program for control of creation or
change of the audio, still picture, graphics, animation
or program segment in a manner synchronized with the
television program.

It should be understood that by television
30 program or program segment, it is intended that at least
one of sound, still picture or sequence of still
pictures, graphics, animation or moving video from
whatever source is included and presented to the user.

Choices can be presented to the user during the
35 program (such as to choose a playing card in a video

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card game by pressing remote control buttons), and the resulting signal interacts with the software to select a choice, whereby the software controls the creation or change of the audio, graphics, animation and/or program

5   segment.

It should also be noted that the term "user location" is not intended to be restricted to a physical location of the user, but can be at a virtual user location. In such case the remote control controls an

10   uplink transmitter to send commands to a parameter storing apparatus and controlling apparatus for display of segments based on the look-up of the parameters and for varying the parameters, located at the head end as a virtual user location. Thus the user controls the above

15   apparatus in a manner as described above, the major different from the embodiment described being that the commands from the remote control are sent from the subscriber to the apparatus via a cable network upstream to the above apparatus located at the head end, as

20   described for example in Canadian Patent 1,327,238 issued February 22, 1994 invented by Michel Dufresne et al and assigned to the same assignee as is this invention, and that the resulting signal is modulated and sent downstream from the head end addressed to the

25   user, for demodulation and presentation to the display of the user, using apparatus as described for example in U.S. Patent 4,623,920 issued November 18, 1986 invented by Michel Dufresne et al and assigned to the same assignee. Both the aforenoted patents are incorporated

30   herein by reference.

While the aforenoted apparatus can be located at the head end as a "virtual user location", it should be noted that individual discrete sets of apparatus need not be used at the head end, and may be merged into at

35   least one computer which performs a similar function for

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all subscribers, but which is more economical in use of apparatus.

Thus the term "downloading" as used in the disclosure and claims is intended to mean providing the
5 programs, etc. of whatever form to the apparatus to which the signals are downloaded, whether that apparatus is located at a virtual user location adjacent a head end or at the actual physical location of the user, downstream of the distribution system.
10 It is intended also that the invention is not restricted to use of a CATV system, but is applicable to other kinds of distribution systems. For example a downstream system can be a satellite to home downlink with a wired or wireless uplink, e.g. by coaxial cable,
15 optical fiber, telephone wire, wireless personal communication system (PCS) etc.

It may thus be seen that with the use of this invention, there may be interaction between the user and the television program, between the user and the
20 parallel process, and between the parallel process and the television program. The system provides true interaction, rather than apparent interaction, which is the case in prior art systems. As a result, a much richer interactive television program experience can be
25 achieved.

The invention can be used, for example, for entertainment, education, training, advertising, etc., and is not restricted to full motion video. For example, it can be used with still frame alone or
30 combined with motion video, digitizing or analog sound, etc. It may also be used to control peripheral equipment that may interface the bus 38. For example, home services may be controlled and monitored by the present invention, using interactive commands.

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A person understanding this invention may now conceive of alternative structures and embodiments or variations of the above. All of those which fall within the scope of the claims appended hereto are considered
5 to be part of the present invention.

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We claim:

1. A method of providing an interactive program to a television user comprising:

(a) transmitting a television program, and transmitting variables relating to possible television program choices,

(b) storing the variables at a user location,

(c) displaying the television program, and modifying the variables from the user location during the progress of the television program, to change the progress of the television program,

whereby program choice variations under control of a user location based on variables modified at the user location rather than modified from a head end are obtained.

2. A method as defined in claim 1 including modifying said variables under control of a user.

3. A method as defined in claim 1 including storing an interactive control program at said user location, and modifying said variables under control of the control program during the progress of said television program.

4. A method as defined in claim 3 including manually interacting with the control program, whereby modification of said variables by said control program is manually variable.

5. A method as defined in claim 3 including transmitting said control program with the television program.

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6. A method as defined in claim 5 including transmitting said control program via at least one data channel.

7. A method as defined in claim 6 in which said data channel is carried by one of a telephone line, a line of a video channel, a wideband channel carried by the same medium as the video channel and a radio
5 channel.

8. A method as defined in claim 1 in which display of graphical overlays produced by a video display generator at the user location are controlled by said variables.
5

9. A method of providing an interactive television program to a television user, comprising the steps of downloading from a head end a software program at frequent intervals during the progress of and with a
5 television program to a user station, receiving the television program, and interacting with the software program to change or create at least one of audio, graphics, still picture and animation on a television monitor and or change a program segment of said
10 television program, for display on a television monitor.

10. A method as defined in claim 9 in which the content of the software program is synchronized with the content of the television program, separate downloads of at least parts of said software program
5 being done during the progress of the television program for control of creation or change of said audio, graphics, animation or program segment in a manner synchronized with the television program.

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11.   A method as defined in claim 10 including downloading the same parts of said software program several times in succession during the progress of the television program, whereby a user is enabled to

5   interact with the software program even if he begins receiving the television program at any time during the program.

12.   A method as defined in claim 11 including presenting choices to the user, and interacting with the software to select a choice, whereby the software controls said creation or change of said audio,

5   graphics, animation or program segment.

13.   A method as defined in claim 9, including presenting choices to the user, by means of a displayed menu, selecting an item from the menu, and controlling a peripheral controller to control a peripheral device by

5   means of said software program reacting to said selection of the item.

14.   A method as defined in claim 11, in which the interaction is performed using a remote control.

15.   A method as defined in claim 9, in which the television program is transmitted via a single channel, said program segment being changed by means of said software program.

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16.   A method as defined in claim 9, in which at least some segments of the television program are transmitted simultaneously via different channels, and program segments are changed under control of the

5   software program switching channels to program the television program in a seamless manner.

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17. A method as defined in claim 9, in which the user station is at a virtual user location adjacent the head end, and in which the interacting step is comprised of sending from an actual user location a

5   command to the user station at the virtual user location, and in which the at least one of audio, graphics, still picture, animation and program segment is transmitted for display on said television display located at an actual user location from the virtual user

10 location.

18. A method as defined in claim 17 in which the command sending step is comprised of sending a signal originating from a user remote control to the user station at the virtual user location, upstream on a

5   two way CATV network.

19. A method of providing an interactive television program to a television user, comprising the steps of downloading a software program to a user station, transmitting a television program having plural

5   parallel segments, and at least one of: the user interacting with the television program to view different segments, the user interacting with the software program to enable the software program to cause display of graphics, animation for viewing by the user,

10 and the software program selecting different segments of the television program for viewing by the user.

20. Apparatus for controlling interaction of a user with a television program comprising means for receiving a television program having several parallel segments, means for storing parameters relating to the

5   segments, means for controlling display to the user of

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segments based on a look-up of said parameters, and means for varying the parameters under local control.

21. Apparatus as defined in claim 20, including means for detecting a control signal from a remote control operated by a user, and for changing said parameters as a result thereof.

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22. Apparatus as defined in claim 20, including means for receiving a software program relating to said television program, and means for changing said parameters under control of the software

5 program.

23. Apparatus as defined in claim 22, including means for detecting a control signal from a remote control operated by a user, and for controlling operation of said software program in response to

5 detection of said control signal.

24. Apparatus as defined in claim 20 in which the receiving, storing, controlling and varying means are located at a virtual user location adjacent a head end of a program distribution system, and including

5 means for sending commands via an uplink in said system to said means located at said virtual user location, and means for transmitting said controlled segments downstream via said system to an actual user location for display thereat.

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The Patent Office

Application No: GB 9511877.4   **Examiner:** Huw Jones

Claims searched: 1-24   **Date of search:** 22 August 1995

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

     UK Cl (Ed.N): H4F - [FBB, FDX, FGG]

     Int Cl (Ed.6): G09B - [5/06]; H04N - [7/16, 7/087, 7/173]

Other: ONLINE: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	EP 0314572 A2 (ACTV) - see whole doc.	—

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
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